REMARKS

Claims 1-3, 5-24, and 26-31 are pending in this application. By this Amendment, claims 1, 17, 28 and 29 are amended. No new matter is added.

The courtesies extended to Applicant's representative by Examiner Holzen at the interview held August 8, 2006, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below and constitute Applicant's record of the interview.

I. §101 Rejection

In the Office Action, claims 1-3, 5-24, and 26-31 are rejected under 35 U.S.C. §101 as allegedly not having a credible asserted utility. This rejection is respectfully traversed.

A. General Utility

During the interview, Applicant discussed the §101 rejection for lack of credible utility. Examiner Holzen reiterated his arguments that the following alleged utilities were questionable: (1) using magnets to <u>cancel</u> gravitational effect; (2) <u>levitating</u> the craft (in space) with magnets by having upper and lower plates of same polarity; and (3) propelling the craft outward (against the gravitational force of the earth).

As set forth in MPEP §2107.01, "in most cases, an applicant's assertion of utility creates a presumption of utility that will be sufficient to satisfy the utility requirement." *In re Jones,* 628 F.2d 1322, 206 USPQ 885 (CCPA 1980). Moreover, an applicant "need only make <u>one</u> credible assertion of specific utility for the claimed invention to satisfy 35 U.S.C. §101...additional statements of utility, even if not 'credible,' do <u>not</u> render the claimed invention lacking in utility" (MPEP §2107.02(I)). Thus, any of Applicant's alleged general utilities, such as reduction in pressure, heat or aerodynamic drag acting on the craft should suffice.

Applicant pointed out to the Examiner that the specification was clear that gravitational effects may be reduced and not necessarily cancelled as alleged. Moreover, Applicant's craft does not rely on electromagnets as a propulsion source as alleged. Instead, main propulsion is achieved by conventional sources, such as jet engines. Finally, the Examiner was overlooking several viable utilities, such as a reduction in pressure, heat or aerodynamic drag acting on the craft, as discussed in Applicant's paragraphs [0003] and [0011].

To address the Examiner's concerns that such utilities are "credible," Applicant identified and showed the Examiner an excerpt from the Columbia University Press Encyclopedia (copy enclosed) regarding electromagnets that states that "electromagnetic propulsion systems can provide motive power for spacecraft" and that electromagnets are "essential to magnetic levitation." This evidence shows that electromagnets have a well-established and "credible" general utility that may be applicable to spacecraft.

During the interview, Examiner Holzen also questioned the meaning and operation of the claimed phrase "controlling the electromagnetic field around at least a portion of the hull to magnetically curve the space adjacent the hull" and whether this had a credible utility.

As agreed upon, Applicant clarifies this passage in the independent claims to recite "magnetically alter the flow or distribution of particles in the vicinity of the hull." This language makes it clear that the area or "space" itself around the hull is not altered, but contents within the area (molecules, particles, etc) are altered. This is supported, for example, by Applicant's paragraph [0011].

As additional evidence of this, Applicant submits a copy of an article showing magnetic field lines and how the area or "space" in the vicinity of a magnet is acted upon by the magnetic field.

Thus, because electromagnets readily generate a field that will repel or attract any magnetized or ionized particles and the act of repelling particles from contact with the craft could serve to reduce pressure, heat or drag on the craft, a useful and "credible" general "utility" is met that does not defy conventional scientific principles.

B. Specific Utility

Examiner Holzen also questioned the specific utility achieved by the recited independent control of multiple sectionalized plates.

As discussed during the interview, because Applicant's craft includes a series of independently controlled electromagnetic plates on both upper and lower surfaces of the craft (and preferably extendable over a substantial majority of the external surface area of a saucer-shaped craft), one exemplary advantage achievable is the ability to adapt the magnetic field to a flight direction (to control pressure, drag, heat, etc.), or to redirect heated particles to the rear of the craft, such as by sequencing. This latter aspect would be particularly useful during reentry or when traveling at high speeds to disperse the large heat built up on the frontal surfaces of the craft.

Thus, because Applicant's invention as defined by independent claims 1, 17, 28 and 29 have at least one credible specific utility, statutory requirements of 35 U.S.C. §101 are met. Withdrawal of the rejection is respectfully requested.

II. Pending Claims Define Patentable Subject Matter

In the Office Action, claims 1, 6, 10, 15, and 16 are rejected under 35 U.S.C. §102(b) over U.S. Patent No. 5,797,563 to Blackburn. This rejection is respectfully traversed.

The Examiner during the interview relied primarily on Blackburn's Figs. 18, 19A and 19B. However, consistent with prior arguments, Applicant points out that Blackburn relies on RF microwave heating of oncoming air to ionize and charge the particles through heating. Then, these positively charged particles are repelled outward perpendicular to the craft's

fuselage while negative ions are attracted to the wing (Fig. 2 and Cols. 7 and 20). Thus, Blackburn relies on the RF heating to charge the particles in the air and the electromagnetic aspects for repelling of certain charged particles. However, because the RF heating would appear to uniformly and consistently charge the particles, there is no teaching, suggestion or appreciation of a need for multiple, sectionalized electromagnetic plates and to individually change or control the polarity of each sectionalized and isolated electromagnetic plate as claimed.

Rather, it would appear to one of ordinary skill in the art that the plates would always have the same polarity. Thus, although Fig. 18 may show two sets of coil wires, Blackburn provides no reason or motivation to independently change the polarity of each plate. Moreover, it is not clear that Blackburn provides a plurality of sectionalized and isolated plates or plates having outer and inner walls fixedly provided on a core as recited in claim 1. Such plates must be isolated in order to be independently changeable in polarity.

As discussed above, the ability to independently control the polarity of individual sectionalized and isolated plates allows for adaptability to flight direction, control of heat build up through sequencing, and other needs that are not appreciated by Blackburn.

Because Blackburn fails to teach each and every feature of independent claim 1, this claim and claims dependent therefrom are not anticipated. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 1, 2, 3, 5-7, and 11 are rejected under 35 U.S.C. §102(b) over U.S. Patent No. 4,891,600 to Cox. This rejection is respectfully traversed.

Independent claim 1 is amended to clarify that "each plate is independently changeable between N and S polarity." In Cox, both plates must have the same polarity. Moreover, independent claim 1 is amended to be "configured to provide" as suggested so as to positively recite structure.

Although Fig. 38 of Cox does appear to show a "saucer-shaped craft, " as pointed out, Cox only provides plates on the top exterior surface of the fuselage and discloses a single coil. This structure does not have individual sectionalized plates, each with a magnetic coil and each independently changing polarity as claimed. That is, plates 904 and 906 in Fig. 38 act as a capacitor and as a necessarily linked "pair." Because there is only a single linked "pair" of plates connected to a single coil source, it is impossible for each plate to be independently changeable between N and S polarity as recited. That is, both plates in Cox are taught to have the same polarity.

Because Cox fails to teach each and every feature of independent claim 1, this claim and claims dependent therefrom are not anticipated. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 8, 9, 14 and 31 are rejected under 35 U.S.C. §103(a) over Cox in view of U.S. Patent No. 6,397,739 to Paterro. This rejection is respectfully traversed.

Paterro fails to overcome the deficiencies of Cox with respect to claim 1. Accordingly, dependent claims 8, 9, 14 and 31 are allowable for their dependence on an allowable base claim. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 16-19, 21-22 and 27 are rejected under 35 U.S.C. §103(a) over Cox in view of Paterro, further in view of ordinary skill in the art. This rejection is respectfully traversed.

Claim 16 is allowable for its dependence on allowable base claim 1.

Regarding independent claim 17, this claim is similar to claim 1, but recites a saucer-shaped hull. As discussed above, Cox fails to teach or suggest a plurality of sectionalized electromagnetic plates that are isolated from each other and each plate being independently changeable between N and S polarity. Paterro fails to overcome the deficiencies of Cox with respect to claim 17. Moreover, as admitted, neither Cox nor Paterro disclose upper and lower

hull portions having a plurality of sectionalized electromagnetic plates. In fact, as discussed above, Cox would have no possible use for isolated and sectionalized plates when only a single coil is provided.

Thus, even if combined, the combination fails to teach each and every feature of claim 17. Accordingly, independent claim 17 and claims dependent therefrom are allowable. Withdrawal of the rejection is respectfully requested.

In the Office Action, claim 20 is rejected under 35 U.S.C. §103(a) over Cox in view of Paterro and ordinary skill in the art, further in view of U.S. Patent Appl. Publ. No. 2003/0127559 to Walmsley. This rejection is respectfully traversed.

Walmsley fails to overcome the deficiencies of Cox and Paterro. Accordingly, claim 20 is allowable for its dependence on allowable base claim 17 and for the additional features recited therein. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 12 and 13 are rejected under 35 U.S.C. §103(a) over Cox in view of Paterro, further in view of ordinary skill in the art. This rejection is respectfully traversed.

The alleged knowledge of one of ordinary skill in the art does not overcome the deficiencies of Cox and Paterro with respect to claim 1. Accordingly, claims 12 and 13 are allowable for their dependence on allowable base claim 1 and for the additional features recited therein. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 23 and 24 are rejected under 35 U.S.C. §103(a) over Cox in view of Paterro, further in view of ordinary skill in the art. This rejection is respectfully traversed.

The alleged knowledge of one of ordinary skill in the art does not overcome the deficiencies of Cox and Paterro. Accordingly, claims 23-24 are allowable for their

dependence on allowable base claim 17 and for the additional features recited therein. Withdrawal of the rejection is respectfully requested.

In the Office Action, claim 28 is rejected under 35 U.S.C. §103(a) over Cox in view of Paterro, further in view of Walmsley and ordinary skill in the art. This rejection is respectfully traversed.

Independent claim 28 also recites that each of the upper and lower hull portions include a plurality of sectionalized electromagnetic plates, <u>each</u> independently changeable between N and S polarity to magnetically alter the flow of particles in the vicinity of the hull. Moreover, claim 28 recites that at least one high frequency oscillator is provided in the form of one or more rings externally provided around the periphery of the hull or in the form of a long tube provided in a cavity defined between adjacent electromagnetic plates.

None of the applied references teach the independently changeable plates recited in claim 28. Moreover, none of the references teach a high frequency oscillator in the form of a ring externally provided around the periphery of the hull or in the form of a long tube provided in a cavity defined between adjacent electromagnetic plates. The Office Action merely alleges that rearrangement would involve only routine skill. However, the applied art fails to appreciate advantages achieved by the specific locations claimed. Although there may be countless locations where an oscillator could be located, Applicant has found distinct advantages to placement in areas near the electromagnetic plates, <u>but</u> not within a main cargo or living quarters of the craft. The recited locations thus achieve benefits of maximizing storage capacity by placing the oscillators at locations that would otherwise be unused space (within cavities in the plates or externally around the periphery of the hull). Moreover, the location of the external ring provides ready access to the oscillator for maintenance and ready access to the plates. These specific locations would not have been obvious in view of the generalized teachings applied.

None of the applied references teach the independently controllable sectionalized plates recited in claim 28. Moreover, none of the references teach a high frequency oscillator in the specific locations claimed. Claim 28 is thus patentably distinct from the applied references. Withdrawal of the rejection is respectfully requested.

In the Office Action, claims 29 and 30 are rejected under 35 U.S.C. §103(a) over Cox in view of Paterro. This rejection is respectfully traversed.

Independent claim 29 recites that each of the upper and lower hull portions include a plurality of sectionalized electromagnetic plates. Moreover, the plates collectively form a substantial portion of the exterior craft surface and are <u>configured to provide a controllable electromagnetic field around the hull that magnetically alters the flow or distribution of particles in the vicinity of the hull</u>. Moreover, claim 29 recites that at least one high frequency oscillator is provided in the form of one or more rings externally provided around the periphery of the hull or in the form of a long tube provided in a cavity defined between adjacent electromagnetic plates.

None of the applied references teach the controllable sectionalized plates recited in claim 29. Moreover, none of the references teach a high frequency oscillator in the specific locations claimed. Claim 29 is thus patentably distinct from the applied references. Withdrawal of the rejection is respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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Stephen P. Catlin
Registration No. 36,101

JAO:SPC/eks

Attachments:
Columbia University Article on Electromagnet
Theodore Ashford Article on Magnets

Date: November 9, 2006

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Magnetism

Magnetic phenomena bear resemblance to the electric phenomena and have been known from time immemorial. Long ago it was discovered by many races independently that the mineral magnetite, Fe_3O_4, has the peculiar property of attracting other pieces of the same mineral as well as pieces of soft iron. It was also known very early that the strength of attraction in a given specimen is localized in certain regions or "poles." In ancient China someone discovered that by shaping the mineral in the form of a bar with the regions of strong attraction near the ends, and suspending it by a thread, the bar orients itself in a north-south position. Another Chinese before the eleventh century had the inspiration to use these "leading stones" or "lodestones" for direction finding. When the discovery reached western Europe, it gave rise to the

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magnetic compass, a device very useful in navigation during the period of expansion of western Europe. The usefulness of the compass spurred the discovery that a magnet can be made very conveniently by stroking a steel bar with a natural magnet, or with another steel magnet.

The magnetic phenomena are in many respects similar to the electrical phenomena. North-seeking poles repel one another, and south-seeking poles repel one another, but north-seeking poles attract south-seeking poles. In magnetism, too, there is attraction at a distance. Similarly there is the phenomenon of induction. A magnet attracts a piece of unmagnetized iron, such as an iron nail. On bringing the magnet near the nail, an opposite pole is induced on the nail, and then attraction follows. A iron nail near a magnet becomes itself temporarily a magnet and can attract other nails. On removal of the magnet, however, the nail loses its magnetism almost instantly. However, if a steel nail or a steel bar is used it retains the magnetism much longer, becoming a "permanent" magnet.

Coulomb investigated the law of attraction-repulsion between magnets and found it to be similar to that of electric charges. The force between two poles is proportional to the product of the strength of the poles and inversely proportional to the square of the distance between them. As in the case of electricity, the medium between the poles alters the force. However, in this case, the medium may *increase* or *decrease* the force as compared to a vacuum. Substances such as iron or nickel *decrease* the force, while substances like bismuth *increase* the force. The amount of increase or decrease is a characteristic of the medium and is called magnetic permeability and symbolized by the Greek letter μ. The entire relation may be stated in Coulomb's law of magnetic attraction-repulsion:

$$f = \frac{P_1 P_2}{\mu \cdot r^2}$$

As in the case of electricity, a unit pole is defined as the pole of such strength that, if placed 1 cm from a second pole of equal strength, it repels or attracts this second pole with the force of 1 dyne.

While the similarities between magnets and charges are striking, there are some very important differences. In the first place charges are *separable*, poles are not. It is easy to separate a negative charge from a positive one (as by rubbing an amber rod with fur) and move either kind any distance and study it separately. When an attempt is made to isolate a north pole by cutting the magnet, however, the piece cut off (as well as the remaining part) becomes a full magnet with both a north end and a south end. No matter how thin a section is cut, it always has a north end and a south end.

Coulomb was aware of this difficulty when he developed the law of magnetic force. He overcame the difficulty in part by using long bar magnets, so that the effect of the other and more distant poles was negligible, although still there. His results were at best approximate and his law is a bold idealization from experience. He overcame the difficulty only mathematically, by correcting for the presence of the other pole.

Another difference is that the amount of magnetism of a bar is inexhaustible. We can make as many magnets as we please from a given magnet by stroking unmagnetized bars, without diminishing the strength of the original in the slightest. This is not so with electricity. Moreover, there is no such thing as "neutralization" in a magnet. Both the S (South-seeking) end and the N (North-seeking) end are on the same body; yet they do not "neutralize" one another. Nor is the phenomenon of conduction found in magnetism. Still another difference lies in the fact that while all bodies can be electrified under suitable conditions, only a few show clearly magnetic properties.

These and other considerations lead to the conclusion that magnetism is not as fundamental a phenomenon as electricity. In fact, as we shall see in the next section, magnetism is but one aspect of electricity, though a very important one.

Magnetic Fields of Force

Before leaving this topic we would like to introduce the idea of magnetic field, which will help us visualize many of the phenomena. From the previous discussions we realize that the space around a magnet, in air or even in a vacuum, is not just ordinary empty space but a region where magnetic forces are present. This region is called a magnetic field. By definition a magnetic field is a region of space in which another magnet—placed in that space—would experience a force of attraction or repulsion.

The field of force surrounding a large magnet is best investigated by using the north pole of a tiny but long magnet—long enough so that the south pole does not interfere appreciably. With this tiny magnet we can explore the space around the large magnet in order to determine where the field is strong and where it is weak, and also to find in which direction the force is exerted at any point. We can then plot the field of force.

We get the idea of a field even more directly from the following experiment. We place a glass plate over a magnet and sprinkle some iron filings. When the glass is tapped, the iron filings line up along certain streamers (as shown in Fig. 4-10), which concentrate near the poles and spread out as they move away from them. Some of the streamers go all the way from one pole to the other. The whole effect resembles a cucumber. The iron filings, becoming tiny magnets by induction, line up to give this pattern. A small compass placed anywhere in the field will line up along these streamers.

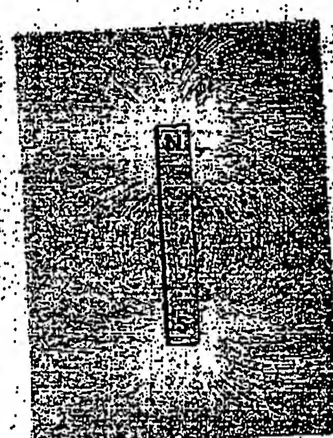

Fig. 4-10. Visualization of a magnetic field. The iron filings line along the invisible "lines of force."

This experiment, more than any other, gives rise to the idea of "lines of force." We can represent a field by drawing these lines of force. Where the field is strong we draw many lines; where it is weak, we draw a few. By lines of force we simply mean the direction of magnetic forces. Thus, a field is represented by the direction and distribution of the lines. In a sense these lines are a fiction. In the absence of iron filings, there are no material filaments—no lines of any material. But the *forces* are still there and are real.

The idea of a field can be applied equally well to any region of space where forces act. Thus around electric charges there is an electric field: that is, another charge in that region would experience a force.

ELECTROMAGNET

device in which magnetism is produced by an electric current. Any electric current produces a magnetic field, but the field near an ordinary straight conductor is rarely strong enough to be of practical use. A strong field can be produced if an insulated wire is wrapped around a soft iron core and a current passed through the wire. The strength of the magnetic field produced by such an electromagnet depends on the number of coils of wire, the magnitude of the current, and the magnetic permeability of the core material; a strong field can be produced from a small current if a large number of turns of wire are used. Unlike the materials from which permanent magnets are made, the soft iron in the core of an electromagnet retains little of the magnetism induced in it by the current after the current has been turned off. This property makes it more useful than a permanent magnet in many applications. Electromagnets are used to lift large masses of magnetic materials, such as scrap iron. They are essential to the design of the electric generator and electric motor and are also employed in doorbells, circuit breakers, television receivers, loudspeakers, atomic particle accelerators, and electromagnetic brakes and clutches. Electromagnetic propulsion systems can provide motive power for spacecraft. Electromagnets are also essential to magnetic levitation systems. Such systems often use a special kind of electromagnet whose coil is made of a superconducting metal. Because the coils of a superconducting electromagnet offers no resistance to the flow of electricity, no energy is wasted by the development of heat, and the magnetic field produced by the magnet can be very strong. Superconducting magnets are used in magnetic-resonance imaging, and can also be used for energy storage. The first practical electromagnet was invented early in the 19th cent. by William Sturgeon.
